METHOD 7780

STRONTIUM (ATOMIC ABSORPTION, DIRECT ASPIRATION)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000.

3.2 Chemical interference caused by silicon, aluminum, and phosphate are controlled by adding lanthanum chloride. Potassium chloride is added to suppress the ionization of strontium. All samples and standards should contain 1 mL of lanthanum chloride/potassium chloride solution (Step 5.3) per 10 mL of solution.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 Strontium hollow cathode lamp.

4.2.2 Wavelength: 460.7 nm.

4.2.3 Fuel: Acetylene.

4.2.4 Oxidant: Air.

4.2.5 Type of flame: Oxidizing (fuel lean).

4.2.6 Background correction: not required.

5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.

5.2 Preparation of standards

5.2.1 Stock solution: (1.0 mL = 1.0 mg Sr). Dissolve 2.415 g of strontium nitrate, $Sr(NO_3)_2$, in 10 mL of concentrated HCl and 700 mL of water. Dilute to 1 liter with water. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid as the samples and cover the range of expected concentrations in the samples. Calibration standards should also contain 1 mL of lanthanum chloride/potassium chloride solution per 10 mL.

5.3 Lanthanum Chloride/Potassium Chloride Solution. Dissolve 11.73 g of lanthanum oxide, La_2O_3, in a minimum amount of concentrated hydrochloric acid (approximately 50 mL). Add 1.91 g of potassium chloride, KCl. Allow solution to cool to room temperature and dilute to 100 mL with water.

CAUTION: REACTION IS VIOLENT! Add acid slowly and in small portions to control the reaction rate upon mixing.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Step 3.1.3, Sample Handling and Preservation.

7.0 PROCEDURE

7.1 Sample preparation - The procedures for preparation of the sample are given in Chapter Three, Step 3.2.

7.2 See Method 7000, Step 7.2, Direct Aspiration.

8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

9.0 METHOD PERFORMANCE

9.1 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 0.3 - 5 mg/L at a wavelength of 460.7 nm.
Sensitivity: 0.15 mg/L.
Detection limit: 0.03 mg/L.

9.1.1 Recoveries of known amounts of strontium in a series of prepared standards were as given in Table 1.

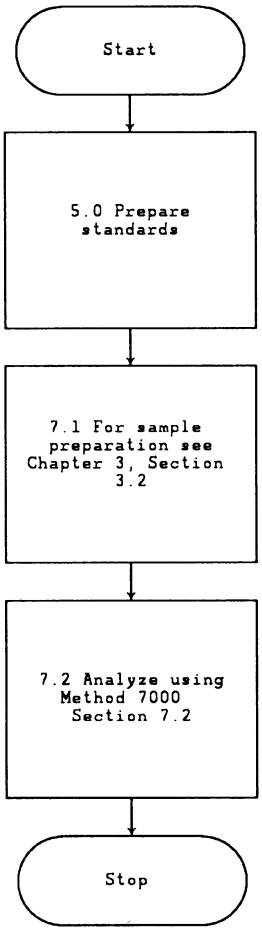
10.0 REFERENCES

1. Annual Book of ASTM Standards; ASTM: Philadelphia, PA, 1983; D3920.

TABLE 1.
RECOVERY

Amount added, mg/L	Amount found, mg/L	Bias	% Bias	Significant (95 % confidence level)
		Reagent Water Type II		
1.00	0.998	-0.002	-0.2	no
0.50	0.503	+0.003	+0.6	no
0.10	0.102	+0.002	+2	no
		Water of Choice		
1.00	1.03	+0.03	+ 3	no
0.50	0.504	+0.004	+ 0.8	no
0.10	0.086	-0.014	-14	no

Reference: Annual Book of ASTM Standards; ASTM: Philadelphia, PA, 1983; D3920.


Start
5.0 Prepare standards
7.1 For sample preparation see Chapter 3, Section 3.2
7.2 Analyze using Method 7000 Section 7.2
Stop